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(71) Applicant(s)
Maclaren Limited
(Incorporated in the United Kingdom)
Station Works, Long Buckby, NORTHAMPTON,
NN6 7PF, United Kingdom

(72) Inventor(s)
Martin Philip Riddiford

(74) Agent and/or Address for Service
Hillgate Patent Services
No 6 Aztec Row, Berners Road, Islington, LONDON,
N1 0PW, United Kingdom

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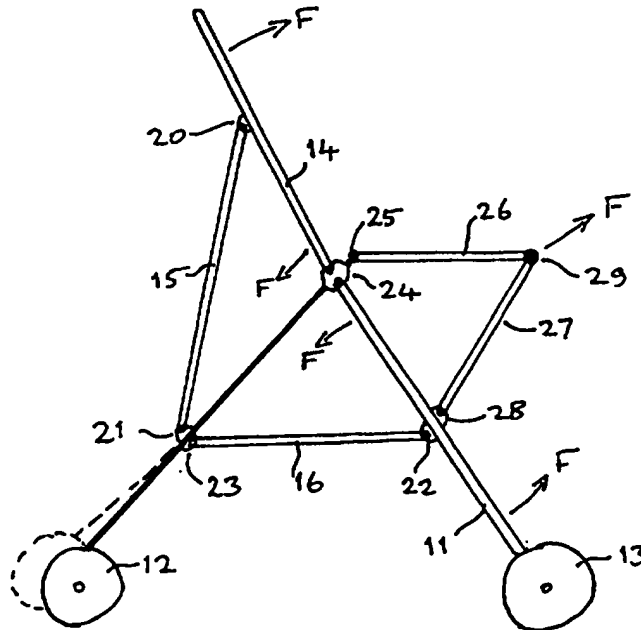
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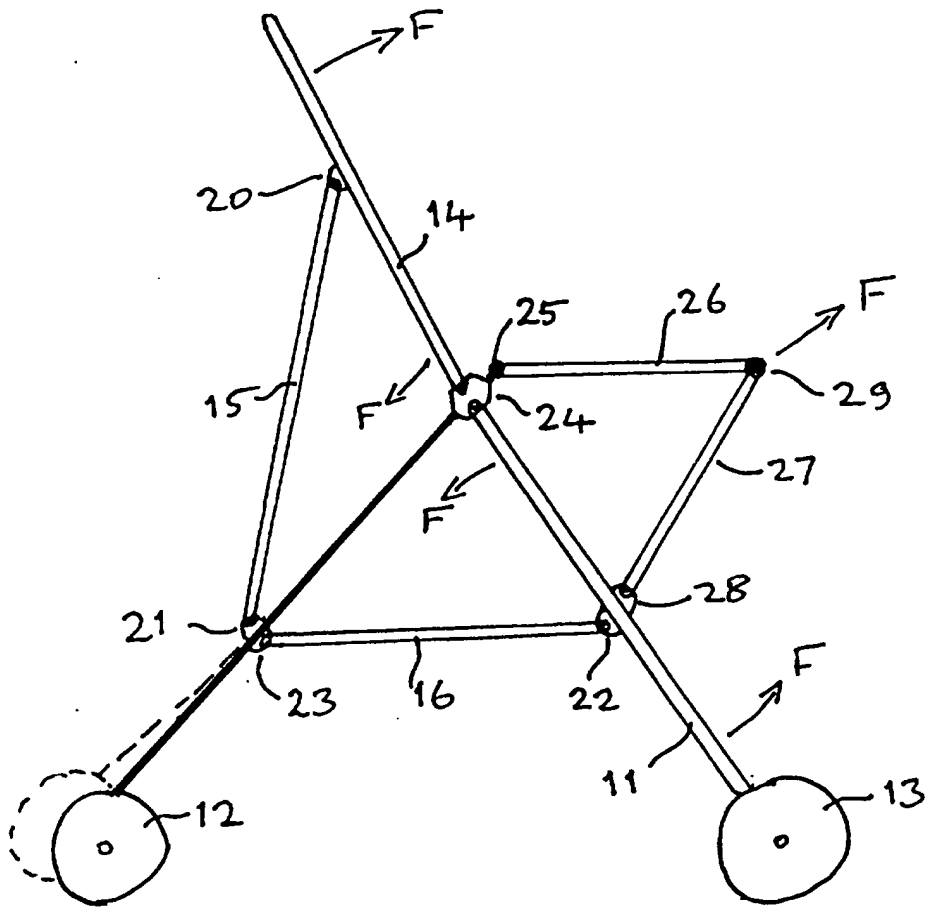
(54) Abstract Title
Push-chairs

(57) A folding push-chair comprises a rear strut made of resilient material, such as a flat strip of spring steel or composite plastic material. If the chair is pushed over bumps or pot-holes, the strut will bend and deform, giving a springing effect and so smoothing the ride of the occupant. For folding, struts 11 and 14 are pivoted to a pivot structure 24 which can slide down the rear strut, rotating struts 11 and 14 in the direction of the arrows F.



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Child's Push-Chairs

5 The present invention relates to push-chairs for children.

 The traditional perambulator consists of a gondola supported on two pairs of relatively large diameter wheels by a coach type suspension using springs of roughly semi-circular form. More recently, a variety of foldable
10 push-chairs, often known as baby buggies, have been developed. These have frames including sloping struts which reach down to close to the ground and have relatively small diameter wheels mounted on them.

 The traditional perambulator is relatively well sprung by the coach-type
15 suspension, which isolates the gondola from bumps in the ground. The more recent form of push-chair is generally less well sprung. Although the wheels generally have relatively thick rubber tyres, the effect of these is limited. Additional springing may be achieved by using spring mountings (of either coiled springs or rubber blocks) for the wheels. In addition, a relatively light-
20 weight and yielding structure may be used for the seat, or the seat may be provided with substantial padding.

 The main object of the present invention is to provide a push-chair having improved springing.

25

 According to the invention there is provided a push-chair having a pair of side folding frames with a seat supported between them, each side frame including at least one strut of substantial resilience extending slopingly upwards from a wheel.

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A push-chair embodying the invention will now be described, by way of example, with reference to the drawings, in which:

Fig. 1 is a side view of the push-chair.

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The drawing shows one side frame of the push-chair in simplified and diagrammatic form. The other side frame is of course similar, and the two sides are spaced apart by cross-bars (not shown) which can take a variety of forms. In some types of push-chair, the cross-bars are hinged or pivoted, so that when the chair is folded, the two side frames are fold together (typically in what is termed an umbrella or 3-dimensional fold); in others, the cross-bars are fixed and the chair folds so that each side frame collapses but the two side frames remain the same distance apart - a 2-dimensional fold.

15 The side frame has three main diagonal struts: a sloping rear strut 10, a sloping front strut 11, and a sloping handle strut 14. The rear and front struts 10 and 11 have wheels 12 and 13 mounted on their bottom ends as shown; the top end of the handle strut 14 has handle means (typically a handle, or a cross-bar forming a handle) attached to it. The chair side also has two further major struts, a vertical strut 15 and a horizontal strut 16. (The terms "vertical" and "horizontal" are used as a convenient contrast to "sloping", but indicate rough directions only.)

25 Bar 15 is hinged to strut 14 at a pivot 20 and to strut 10 at a pivot 21, and strut 16 is hinged to strut 11 at a pivot 22 and to strut 10 at a pivot 23. The two pivots 21 and 23 are preferably close together, and can be formed by a common pivot structure mounted on strut 10. The strut 10 also carries a slider structure 24, to which the ends of the struts 11 and 14 are pivoted as shown. The movement of the slider 24 upwards along the strut 10 is limited by an end stop 25.

30

The basic fold is achieved by sliding the slider structure 24 up and down the strut 10. With the slider 24 at the top of the strut, the side frame is in the extended position substantially as shown, with the struts 11 and 14 aligned.

5 Locking means (not shown) are provided to lock the slider 24 against the end stop 25; these locking means operate automatically as the slider reaches the end stop, and can then be released manually to allow the chair to be folded.

To fold the chair, the slider is moved down the strut 10. This rotates

10 the strut 11 anticlockwise and the strut 14 clockwise (under the constraint of the struts 15 and 16), as shown by the arrows F, until they are aligned with the strut 10. For effective folding, the length of strut 15 (up to the pivot point 20) minus the length of strut 14 must match the length of strut 16 minus the length of strut 11 (down to the pivot point 22).

15

The chair seat is not shown, as this is not relevant for present purposes. The seat can be a rigid structure if the chair is to fold only front-to-back, or a flexible structure (typically of canvas or similar material) if the chair is to fold side-to-side as well. The seat back can conveniently extend roughly vertically

20 more or less along the line defined by strut 15, and the seat base can conveniently extend roughly horizontally along the line defined by strut 16. (The seat back is preferably reclinable.) A footrest can be provided, eg on an extension (not shown) of strut 16.

25 An arm-rest is provided by a horizontal strut 26 and a vertical strut 27. Bar 26 is hinged to the end 25 of strut 10, and strut 27 is hinged to a pivot 28 on strut 11. The two pivots 22 and 28 are preferably close together, and can be formed by a common pivot structure on strut 11. The struts 26 and 27 are also pivoted together at their other ends 29 as shown. When the chair is folded, the

30 two struts 26 and 27 move towards each other, with their pivot point 29 moving

to the right as indicated by the arrow. For effective folding, the distance along strut 10 from the pivot point 23 to its end stop 25 plus the length of the strut 26 must match the sum of the lengths of the struts 16 and 27.

5 To achieve improved springing or suspension, the strut 10 is made in the form of a flat strip of spring steel or similar material such as composite plastics material. The strip is oriented with its width side-to-side, allowing the strip to bend in the plane of the side frame but not out of that plane. The other struts are made of non-flexible materials and have cross-sections which make them
10 substantially rigid.

 If the rear wheel 12 of the push-chair is pushed over a bump, that will tend to raise that wheel. The portion of the strut 10 between the wheel 10 and the pivot points 21 and 23 will temporarily bend into a curve which is convex
15 downwards, as indicated by the broken line. This will effectively cushion the effect of the bump. Similarly, if the wheel 12 drops briefly into a pot-hole, the strut 10 will bend to cushion the effect of the hole. The effect of bumps and potholes on the front wheel 13 will be transmitted through the frame to the strut 10, which will therefore cushion the effects of those impacts as well.

20

 As an alternative to a flat strut, a pair of tubular or rod-like resilient elements may be mounted side by side. Each member individually can bend in any direction, but the side-by-side mounting will restrict the combined bending to the plane of the side frame.

25

 The side frame may include a relatively broad moulding (not shown) of plastics material extending between the end stop 25 and the pivot points 21 and 23. (One major purpose of this moulding is to protect the mechanism from the fingers of a small child seated in the chair.) This moulding preferably forms a
30 relatively rigid mounting for the strut 10 at the pivot points 23. This broadly

confines the bending of the strut 10 to the portion between the pivot points 21 and 23 and the wheel 12.

5 However, if the mounting of the strut 10 allows the strut 10 to flex in its mounting at the pivot points 21 and 23 (as may be permissible with some side frame geometries), significant bending of the strut may also occur between these pivot points and its top end 25. In this case, the strut 10 would preferably be made somewhat stiffer, as bending will occur over the whole length of the strut instead of over only a part of it.

10

 A convenient length for the bending portion of the strut 10 is around 200 mm. Its resilience can conveniently be such that, when a standard child weight of 15 kg (a force of 150 N) is placed on the seat, a downward deflection of about 10 mm or more occurs at the pivot points 21 and 23. This is an order of
15 magnitude or more greater than the deflection which would occur in a typical rigid strut under the same conditions.

 The embodiment described uses a particular form of folding (using the slider 24), but the principle of a resilient strut can of course be applied to other
20 forms of folding structure as well. Also, the side frame of the embodiment described uses a single resilient strut, but a plurality of resilient struts can of course be used (eg strut 11 could be at least partly resilient as well).

Claims

- 5 1 A push-chair having a pair of side folding frames with a seat supported
between them, each side frame including at least one strut of substantial
resilience extending slopingly upwards from a wheel.
- 2 A push-chair according to claim 1 wherein the resilient strut extends to
10 the rear wheel.
- 3 A push-chair substantially as herein described and illustrated.
- 4 Any novel and inventive feature or combination of features specifically
15 disclosed herein within the meaning of Article 4H of the International
Convention (Paris Convention).



Application No: GB 9914392.7
Claims searched: 1-3

Examiner: Keith Kennett
Date of search: 10 November 1999

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.Q): B7B (BTF1)

Int Cl (Ed.6): B62B 7/06, 7/08, 9/18

Other: Online: EPODOC, WPI, JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2084086 A (EUROLANDO) see whole document	1,2

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.